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## The chromosome number and karyotype of *Polyommatus (Agrodiaetus) ripartii* and *Polyommatus (Agrodiaetus) aroaniensis* from Greece (Lepidoptera: Lycaenidae)

John G. Coutsis, Jurate Puplesiene & Willy De Prins

**Samenvatting.** Het chromosoomnummer en karyotype van *Polyommatus (Agrodiaetus) ripartii* en van *Polyommatus (Agrodiaetus) aroaniensis* in Griekenland (Lepidoptera: Lycaenidae)

Het aantal chromosomen in *Polyommatus (Agrodiaetus) ripartii pelopi* (Brown, 1976) bedraagt  $n=90$  en het karyotype is identiek aan dat van *Polyommatus (Agrodiaetus) ripartii* (Freyer, 1830). De synonymie van beide namen (cf. Hesselbarth, van Oorschot & Wagener 1995) wordt hiermede bevestigd. Het aantal chromosomen in *Polyommatus (Agrodiaetus) aroaniensis* (Brown, 1976) bedraagt  $n=48$ , duidelijk verschillend van dat van *Polyommatus (Agrodiaetus) alcestis* (Zerny, 1932) ( $n=19-22$ ), waarmee aangetoond wordt dat beide taxa specifiek verschillend zijn.

**Résumé.** Le nombre de chromosomes et le caryotype de *Polyommatus (Agrodiaetus) ripartii* et de *Polyommatus (Agrodiaetus) aroaniensis* en Grèce (Lepidoptera: Lycaenidae)

Le nombre de chromosomes de *Polyommatus (Agrodiaetus) ripartii pelopi* (Brown, 1976) est  $n=90$  et le caryotype est identique à celui de *Polyommatus (Agrodiaetus) ripartii* (Freyer, 1830). Ainsi, la synonymie de ces deux noms (cf. Hesselbarth, van Oorschot & Wagener 1995) est confirmée. Le nombre de chromosomes de *Polyommatus (Agrodiaetus) aroaniensis* (Brown, 1976) est  $n=48$ , apparemment très différent du nombre de *Polyommatus (Agrodiaetus) alcestis* (Zerny, 1932) ( $n=19-22$ ), démontrant ainsi que ces deux taxons sont spécifiquement distincts.

**Key words:** *Polyommatus (Agrodiaetus) ripartii pelopi* – *Polyommatus (Agrodiaetus) aroaniensis* – *Polyommatus (Agrodiaetus) alcestis* – *Polyommatus (Agrodiaetus) humedasae* – karyology – chromosome number

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### *Polyommatus (Agrodiaetus) ripartii* (Freyer, 1830)

The nominal taxon *Agrodiaetus ripartii pelopi* was described by Brown (1976a: 47) from material collected in Greece, Peloponnisos, Mt. Helmós and was considered to be conspecific with *Polyommatus (Agrodiaetus) ripartii* (Freyer, 1830) on the basis of overall superficial affinities to the latter. The parallel existence, however, of certain superficial differences were deemed important and constant enough to warrant its subspecific separation from nominate *ripartii*.

At a later date it was made known to JGC through personal communication that the chromosome number of *pelopi* was found to be far below that of *ripartii* ( $n=90$ ), suggesting that the former may very well be a good species in its own right.

Recently the testes of seven *pelopi* specimens, five of which are from the type locality, were fixed by JGC and then prepared by JP for chromosome count and karyotype determination. The data of these preparations are as follows: JC98005, JC98007, JC98019, JC98021 and JC98023, all: Greece, Pelopónnisos, Mt. Helmós, 1200–1300m, 12.VII.1998; JC98001 and JC98003, both: Greece, Pelopónnisos, Mt. Táiyetos, 1300m, 9.VII.1998.

Certain of these counts were done with approximation due to the fact that the chromosomes were situated at different levels, (thus reducing the contrast of certain bivalents), and that some of them overlapped. In preparations Nos JC98005 and JC98007, for instance, in a single *M I* plate checked for each specimen,  $n$  was found to be respectively greater than 85 and ca. 87–88. In preparation JC98023 one *M I* plate showed  $n=90$ , while a single *M II* plate gave  $n=88$ . In preparation JC98019 a single *M I* plate was precisely determined as  $n=90$ . In preparation JC98003 three *M I* plates showed  $n=90$  in all three cases. In preparation JC98021 one *M I* plate showed  $n=90$ , another showed  $n=$ ca. 86–88 and a third one showed  $n=$ ca. 89. Finally, in preparation JC98001 three *M I* and three *M II* plates all showed  $n=90$  (see fig. 1a–b).

The karyotype bears two distinctly large bivalents, situated centrally and close to one another, one of which, the largest, is oval and isopycnotical, while the other is elongated, heteropycnotical and about 60% the size of the former. In most *M I* plates this last mentioned chromosome shows delayed chiasma. The rest of the bivalents are elongated, or dumb-bell shaped, relatively small and of gradually diminishing size. In certain cases four to six of the small bivalents were observed to show terminal associations.

The most probable reason for the existence of numerical differences in chromosome counts is not individual variation, but rather the difficulty of correct interpretation, due to the very small size of the bivalents and their tendency to overlap. In this case the highest number must be regarded as the closest to actuality and therefore the chromosome number of *pelopi* must be considered as  $n=90$ . This value coincides with *ripartii* from both France ( $n=90$ , Col de Brouis; de Lesse 1960a: 188), Spain ( $n=90$ , Huesca, Tarragona; de Lesse 1961: 52) and Turkey ( $n=90$ , Akşehir, Kayseri, Suşeri, 47 km W Erzincan; de Lesse 1960b: 248). This, coupled with both superficial and genitalia similarities, leaves no doubt in one's mind that *pelopi* is conspecific with *ripartii*, thus confirming Brown's original opinion.

An extensive series of *pelopi* from the type locality, now in JGC's possession, shows that this taxon exhibits a wide range of individual variation, with many a specimen being superficially indistinguishable from specimens originating from other geographic localities, both within and outside Greece. In view of this and in view of the fact that *ripartii* inhabits medium altitude montane areas with a vast and often continuous range (thus allowing gene transfer), it is suggested that perhaps any variation present may be either individual or clinal and thus unimportant from a subspecific point of view. Hesselbarth, van Oorschot & Wagener (1995: 715) already placed *Agrodiaetus ripartii pelopi* Brown, 1976 as a junior subjective synonym of *Lycaena* Pap. *Ripartii* Freyer, 1830. Present karyological data fully supports this conclusion.

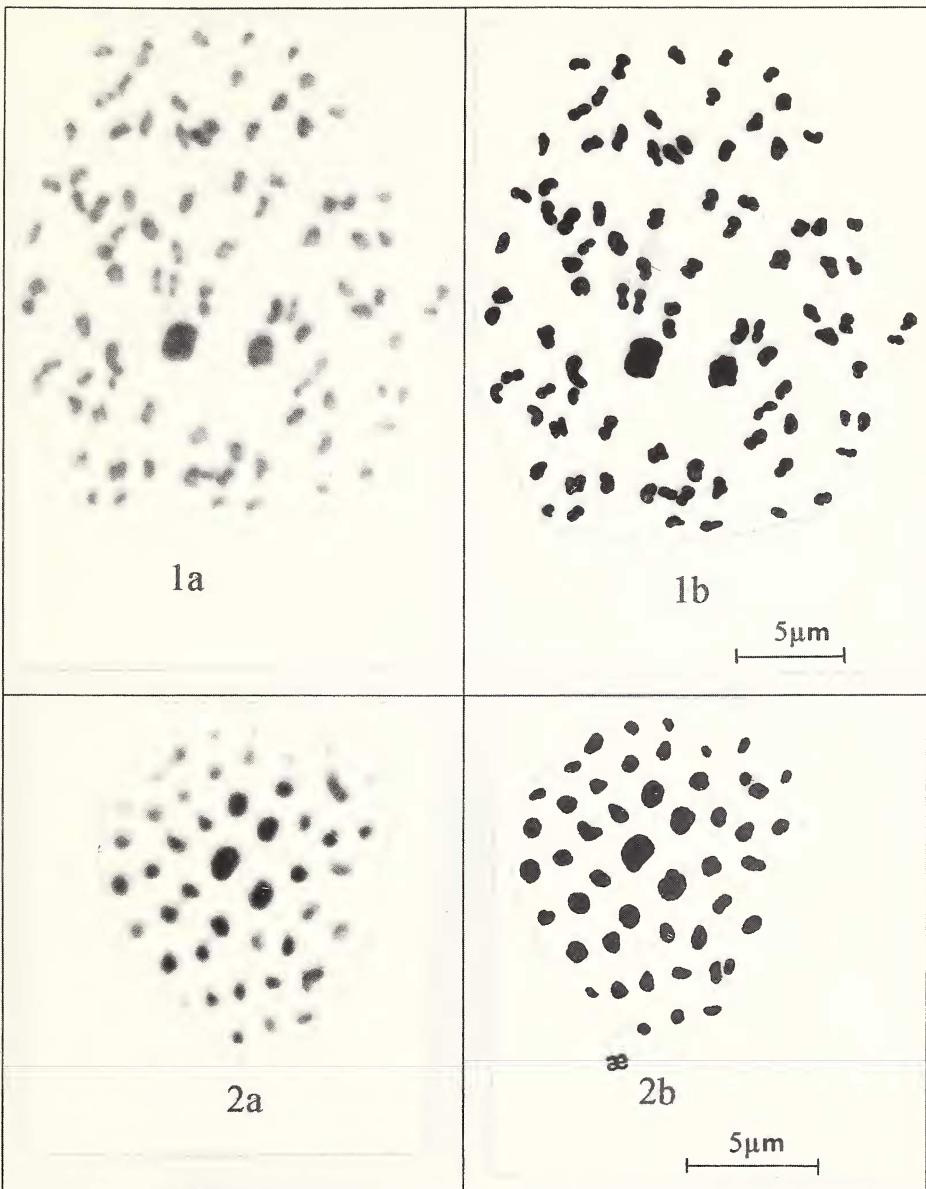


Fig. 1. Karyotype of *Polyommatus (Agrodiætus) ripartii* (Freyer, 1830), Greece, Pelopónnisos, Mt. Taiyetos, 1300m, 9.VII.1998. Preparation No. JC98012.  $M\ I$ ,  $n=90$  (a. Photograph of chromosomes – b. Interpretative drawing of chromosomes) (Photographs by JP, drawings by JGC).

Fig. 2. Karyotype of *Polyommatus (Agrodiætus) aroaniensis* (Brown, 1976), Greece, Pelopónnisos, Mt. Helmós, 1200–1300m, 12.VII.1998. Preparation No. JC98001.  $M\ I$ ,  $n=48$ . (a. Photograph of chromosomes – b. Interpretative drawing of chromosomes) (Photographs by JP, drawings by JGC).

### *Polyommatus (Agrodiaetus) aroaniensis* (Brown, 1976)

The taxon *Agrodiaetus alcestis aroaniensis* was likewise described by Brown (1976b: 78–81) from material collected in Greece, Pelopónnisos, Mt. Helmós. Separation from *pelopi* at a specific level was based on constant superficial and genitalial differences. Its chromosome number was determined by Brown (1976: 81) as  $n=15-16$ . The proximity of this value to the chromosome number of *Polyommatus (Agrodiaetus) alcestis* (Zerny, 1932), (in turn determined by de Lesse as varying from  $n=19$  to  $n=22$ , according to locality), and the fact that the two taxa share similar genitalia, led Brown to consider *aroaniensis* as being a subspecies of *alcestis*.

The following data refer to testes of this taxon, originally fixed by JGC and eventually prepared for chromosome count and karyotype description by JP: JC98012 and JC98022, both: Greece, Pelopónnisos, Mt. Helmós, 1200–1300m, 12.VII.1998.

In preparation JC98012 two metaphase *M I* plates were observed and counted and both showed  $n=48$ . In preparation JC98022, one *M I* plate showed  $n=ca.48-49$  and one *M II* plate showed  $n=ca.47-48$  (see fig. 2a–b).

The structure of the karyotype in *M I* contains two groups of bivalents, the first one consisting of six easily recognised, large, oval ones and the second one, of medium-sized ones, that are approximately 40% the size of the larger ones. The large bivalents are located in one central row on the metaphase plate, the first two being about equal in size and the other four gradually diminishing in size. The medium-sized bivalents, likewise gradually diminish in size; as a rule they are either dumb-bell shaped, or variably elongated, while a few pairs of them show telomeric associations.

These results show that Brown's original chromosome counts for *aroaniensis* were erroneous and that this taxon is a specifically distinct entity, separable both from *alcestis*, as well as from the superficially quite similar and structurally identical *Polyommatus (Agrodiaetus) humedasae* (Toso & Balletto, 1976) from Italy, whose chromosome number was found to be  $n=38$  (Troiano, Balletto & Toso 1979: 141–143).

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